National Renewable Energy Laboratory

IEA Annex XIX : Turbines in Cold Climates

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Operated for the U.S. Department of Energy by Midwest Research Institute • Battelle • Bechtel

Annex Mission

Gather and share information of WTG operating in cold climates

- Establish a site classification formula,
- combining meteorological conditions and local needs.
- Establish a classification formula on standard and adapted technologies and operational strategies to match the site assessment classification.
- Monitor the reliability and availability of standard and adapted wind turbine technology that has been applied.
- Establish and present guidelines for applying wind energy in cold climates

NREL

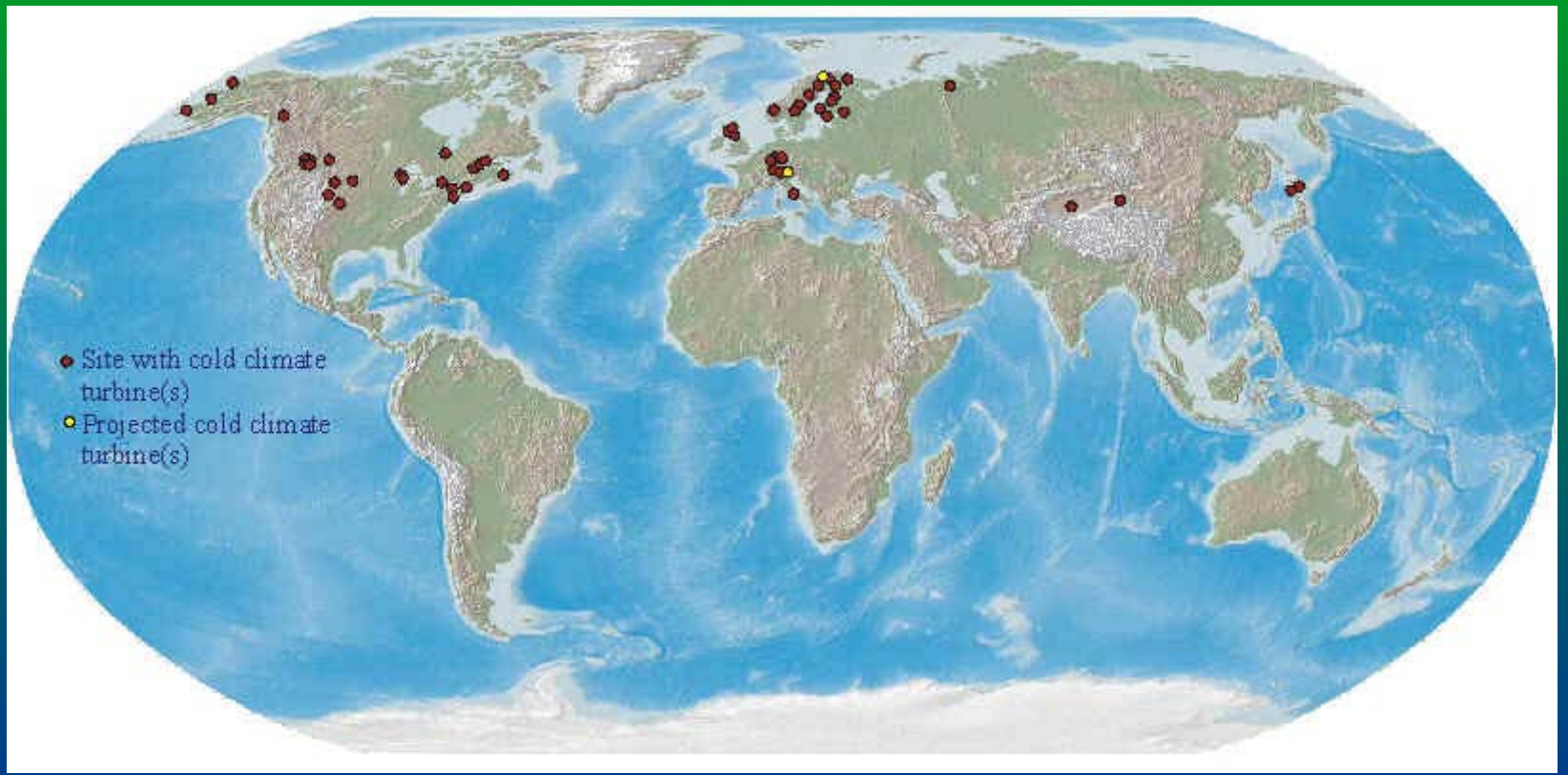
Market...

We all know it…

Wind turbines that either operate at outside the operational limits (lower than -20ºC) or that experience icing that causes production losses or impacts the type of turbine required.

Over 530 MW of wind turbines currently installed in areas that experience either cold and/or icing climates

Current Status and Systems….



Impacts

- Ice Shedding (safety issues)
- Down time due to ice buildup
- Down time due to the icing of instruments
- Energy losses to power mitigation equipment
- Siting studies of turbines in icing climates… how do you know?
- Equipment damage

The Annex

- Currently 7 member organizations
  - Finland, Sweden, Norway, Switzerland, Canada, Denmark and USA.
- Operating Agent is VTT Processes Energy Systems (Finland)
- Three year program initiated winter of 2001
- Looking for more members interested in the working on this topic

Current Standings

Paper describing current understanding of

- Operational Experience in cold and icing climates
- Technical solutions for turbine use in climates
- Measurements & Instruments

Research focuses

- Site Assessment and Classification
- Technology and Operations Classification
- Operation and Performance Experiences
- Extraordinary Operational Events

Contact Information

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IEA JCG on Hybrids

Basis of the Work

- French document submitted in 1997 that was not coordinated with the technical committees
- Joint Coordinating Group of
  - TC62 (Batteries)
  - TC82 (PV)
  - TC88 (Wind Turbines)
  - TC105 (Fuel Cells)
- Focus on systems under 50kW output

Current focus

62257-1	General introduction	Final
62257-2	From requirements of users to a range of electrification systems	Final
62257-3	System selection	Initial Review
62257-4	System design	Initial Review
62257-5	Safety rules	Draft

62257-6	Acceptance-Operation, maintenance and renewal	Int
62257-7	Technical specification - Generators	
62257-8	Technical specification - Batteries and convertors	
62257-9	Technical specification - Integrated systems	
62257-10	Energy management	
62257-11	Technical specification - Consideration for grid connection	
62257-12	Other topics	

Ongoing Work

- Meetings about three times a year
- Part of the IEC standard process
- Encourage people to take part in this activity
- The question….. Will the committee want to expand the scope at the end of the review of the initial French document to break into wind diesel applications.